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Tyler C. Smith,^{a,b} Deborah L. Wingard,^b Margaret A. K. Ryan,^{a,b} Donna Kritz-Silverstein,^b Donald J. Slymen,^c and James F. Sallis,^d for the Millennium Cohort Study Team

Background: Factors that make people vulnerable to or resilient against posttraumatic stress disorder (PTSD) following overwhelming stress are not well understood. The objective of this study was to prospectively examine the relation between prior assault and new-onset PTSD symptoms in a large US military cohort deployed in the wars in Iraq and Afghanistan.

Methods: Data on exposures and health outcomes were collected in the Millennium Cohort study at enrollment (July 2001 to June 2003) and follow-up (June 2004 to February 2006) from over 55,000 participants. Of these, 5324 were deployed in Iraq and Afghanistan, reported combat exposures, and were free of PTSD at baseline (881 women and 4443 men). We used multivariable logistic regression analysis to model the odds of new-onset PTSD in relation to prior assault.

Results: New-onset PTSD symptoms or diagnosis among deployers reporting combat exposures occurred in 22% of women who reported prior assault and 10% not reporting prior assault. Among men reporting prior assault, rates were 12% and 6%, respectively. Adjusting for baseline factors, the odds of new-onset PTSD symptoms was more than 2-fold higher in both women and men who reported assault prior to deployment.

Conclusions: Prior assault appears to confer increased vulnerability for, rather than resilience against, PTSD symptoms among military professionals deployed to recent combat operations.

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Posttraumatic stress disorder (PTSD) symptoms have been reported among as many as 30% of veterans following service in Vietnam and in as many as 10% of US military personnel returning from the 1991 Gulf War.^{1–7} The current combat deployments to Iraq and Afghanistan are marked by

intense urban combat, persistent risk of roadside bombs, multiple and prolonged tours, and ambiguous threats such as differentiating enemy and nonenemy combatants. There is evidence that as many as 10% of deployed military members have PTSD symptoms following stressful experiences during current combat deployments in Iraq and Afghanistan.^{8,9,9a}

The level of vulnerability for, or resilience against, PTSD symptoms in individuals following overwhelming stress is not well understood. Some have suggested that after exposure to traumatic events, limbic nuclei may become kindled or sensitized,^{10–12} while others have suggested that stress inoculation occurs with repeated exposures to traumatic events.^{13,14} While wartime stressors are known to cause PTSD symptoms, it is plausible that wartime threats in combination with individual risk factors serve to heighten vulnerability of some individuals to postwar PTSD symptoms. Victims of prior assault and those with a history of mental illness have been shown to exhibit less optimal levels of mental health and higher risk for PTSD after a stressful experience.^{15–24} Epidemiologic studies of PTSD in military members to date have been based largely on retrospective data, rendering investigation of etiologic pathways of PTSD (including prior sexual or violent assault) inconclusive. The objective of the present study was to conduct a prospective investigation of the relationship between prior assault and PTSD in a large US military cohort of service members deployed to combat in the wars in Iraq and Afghanistan.

METHODS

Study Population

Eleven percent of the men and women in military service as of October 1, 2000 were invited to participate in the Millennium Cohort study.²⁵ They were sampled using a probability-based method with over-sampling for women and prior deployers. Baseline enrollment between July 2001 and June 2003 used a modified Dillman method for enrollment cycles²⁶ to establish a population-based military cohort of over 77,000 (36% response rate) regular active-duty and Reserve/National Guard members from all services.²⁵ Analyses to investigate potential reporting biases show the following: no differences in responder health with respect to hospitalization and outpatient encounters in the year prior to

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enrollment,²⁷ strong test-retest reliability,²⁸ and reliable reporting of vaccinations,^{29,30} occupations,³¹ and deployment reporting.³² Additionally, there were minimal differences between participants choosing Web submission of questionnaires in comparison with those opting for paper submission.³³ Between June 2004 and February 2006, 55,021 (71%) submitted their first 3-year follow-up questionnaire. Analyses of potential responder bias to the initial follow-up are ongoing. The current study included only participants who were free of PTSD symptoms and diagnosis at baseline, deployed in the wars in Iraq and Afghanistan after baseline and prior to follow-up survey submissions, and reported combat exposures on their follow-up questionnaire. This resulted in a population of 5359 (890 women and 4469 men) for investigation.

Baseline demographic and military personnel data included sex, birth year (categorized by groups: pre-1960, 1960–1969, 1970–1979, and 1980 forward), level of education (high school or less, some college or college graduate with bachelor's degree, college graduate with higher than a bachelor's degree), marital status (married, never married, divorced/other), pay grade (enlisted or officer), race/ethnicity (white non-Hispanic, black non-Hispanic, and other), service component (active duty or Reserve/National Guard), service branch (Army, Air Force, Navy/Coast Guard, and Marines), and occupation (combat specialist, healthcare specialist, service supply and functional support specialist, or other).

Deployment Data

Participants were considered deployed if they were regular active duty or Reserve/National Guard personnel who deployed to Iraq or Afghanistan between their baseline and follow-up questionnaires. Deployment data were provided by the Defense Manpower Data Center, Monterey Bay, California and included entry and exit deployment dates.

PTSD Assessment

Diagnosing PTSD is complex, resulting in differences in reported prevalence estimates based solely on criteria of diagnosis.² For the present study, we used the PTSD Checklist-Civilian Version (PCL-C), with specific criteria for PTSD symptoms. These criteria employ the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV) with an additional requirement of a sum of 50 points for all questions in the PCL-C.^{8,34,35} This approach for diagnosing PTSD has been shown to have reasonable sensitivity (0.60) and high specificity (0.99).³⁴ The PCL-C is a 17-item self-report measure of PTSD symptoms that requires participants to rate the severity of each symptom during the past 30 days on a Likert scale ranging from 1 (not at all) to 5 (extremely). The DSM-IV criteria for PTSD were met when a participant reported a moderate or higher level of at least 1 intrusion symptom (flashbacks and memories of past events intruding into your current life), 3 avoidance symptoms (symptoms of unconscious attempts to prevent remembering anything to do

with the traumatic event), and 2 hyperarousal symptoms (symptoms including insomnia, trouble remembering, difficulty concentrating, and irritability).³⁵ An investigation of the internal consistency of the PCL-C in the Millennium Cohort indicated that the PCL-C had sufficiently high reliability and was an appropriate measurement tool for this population (Cronbach's $\alpha = 0.94$).²⁸

To assess previous PTSD diagnosis, PTSD was one of the choices in answer to, "Has your doctor or other health professional EVER told you that you have any of the following conditions?" In the follow-up questionnaire, instead of "EVER," "last 3 years" was used to indicate recent diagnosis.

Assault Information

Prior assault was assessed at baseline using responses to the following questions and responses: "Have you EVER had any of the following life events happen to you?": (1) "Suffered forced sexual relations or sexual assault" (2) "Suffered a violent assault." These 2 questions were combined to characterize the assault variable.

Behavioral Risk-Factor Information

Cigarette smoking at baseline (never, smoker, past smoker, and current smoker) was assessed using responses to the following questions: "In your lifetime, have you smoked at least 100 cigarettes (5 packs)?," "In the past year have you used cigarettes?," and "Have you ever tried to quit smoking?" Problem alcohol drinking (yes/no) at baseline was assessed using the 4-item CAGE questionnaire that measures feelings of needing to cut down on drinking, annoyance with criticism of drinking, guilt, and needing an eye-opener.³⁶

Combat-Exposure Information

To identify combat deployers, the following questions assessed at follow-up were aggregated and combined with deployment data: "During the past 3 years, have you been PERSONALLY exposed to any of the following?" Answer options were "Witnessing a person's death due to war, disaster, or tragic event," "Witnessing instances of physical abuse (torture, beating, rape)," "Dead and/or decomposing bodies," "Maimed soldiers or civilians," and "Prisoners of war or refugees." These were combined with deployment experience to restrict the population to those who deployed and also self-reported stressful or combat exposures.

Data Analysis

Analyses were limited to Cohort members who were deployed in support of the wars in Iraq or Afghanistan between baseline and follow-up who also self-reported combat exposures. Descriptive and univariate analyses of population characteristics by prior assault status and new-onset PTSD symptoms or diagnosis were stratified by sex.

We used multivariable logistic regression to compare the adjusted odds of new-onset PTSD symptoms or diagnosis for those who reported prior assault at baseline with those

who did not. After noting the large differences in prevalence and type of prior assault reported by men and women, we stratified the analyses by sex. Two models were developed: a reduced model that excluded potential pathway variables (cigarette smoking, alcohol drinking, and marital status), and a full model including all variables. We computed odds ratios (ORs) and 95% confidence intervals (CIs). Presence of multicollinearity was assessed using the variance inflation factor, with a value greater than 4 suggesting presence of this condition. Data management and statistical analyses were performed using SAS software (version 9.1.3, SAS Institute, Inc., Cary, NC). This research has been conducted in compliance with all applicable federal regulations governing the protection of human subjects in research (Protocol NHRC.2000.007).

RESULTS

Data for this analysis were complete for 5324 of 5359 study participants (99%; 881 women, 4443 men). Prior assault was reported by 28% of women (5% violent assault only, 16% sexual assault only, 7% both) and 9% of men (8% violent assault only, <1% sexual assault only, <1% both). Among women, assault was higher among those who had high school or less education, were married or divorced, reported current or past smoking and problem drinking, and were enlisted personnel (Table 1). Among men, assault was higher among those who were younger, had high school or less education, and were never married.

Table 2 presents the percent of new-onset PTSD symptoms or diagnosis among women and men who were deployed in Iraq or Afghanistan and who reported combat exposures. Among women, the percent of new-onset PTSD was 13% overall, and 22% among women who also reported a baseline assault. Among men, the percent of new-onset PTSD was 7% overall and 12% among men reporting prior assault at baseline. Other factors associated with new-onset PTSD among both women and men included being younger, having a high school education or less, reporting current smoking or problem drinking at baseline, and being enlisted. Additional factors among women were serving in the Army or Marines and being service supply and functional support specialists. Among men, additional factors were serving in the Reserve/National Guard, and serving in Army.

The results of multivariable logistic regression analysis for new-onset PTSD, stratified by sex, are presented in Table 3. Investigation did not identify variables exhibiting noteworthy multicollinearity using a variance inflation level of 4.0. Among women who were deployed and reported combat exposures, those reporting prior assault at baseline had higher odds of postdeployment PTSD symptoms (OR = 2.4 [95% CI = 1.6–3.6]) than those not reporting prior assault (after adjusting for baseline characteristics, including age, education, marital status, race/ethnicity, prior deployment, rank, service component, service branch, and occupation). When potential

pathway variables (marital status, current cigarette smoking, and problem alcohol drinking) were also included in the model, those reporting prior assault at baseline had higher odds of postdeployment PTSD symptoms (2.3 [1.5–3.5]).

To better understand whether results differed by type of assault, we conducted subanalyses by type of assault. Among women, after excluding those reporting a violent assault, an analysis of prior sexual assault yielded results consistent with the over-all model. Similarly, women reporting only a prior violent assault had similar measures of effects, suggesting that type of assault did not alter the effect that any prior assault has on new-onset PTSD symptoms.

Among men, those reporting assault at baseline had higher odds of postdeployment PTSD symptoms (2.1 [1.5–3.0]) than those not reporting assault, after adjusting for baseline characteristics including age, education, marital status, race/ethnicity, prior deployment rank, service component, service branch, and occupation. When potential pathway variables (marital status, current cigarette smoking, and problem alcohol drinking) were added to the model, those reporting prior assault at baseline had higher odds of postdeployment PTSD symptoms (2.0 [1.4–2.8]).

DISCUSSION

There is increasing public concern for military members returning from current combat deployments where, recent reports have suggested, as many as 10% of personnel may have symptoms of PTSD (Smith TC et al, unpublished data).⁸ The predisposition or vulnerability for new onset of PTSD symptoms in military personnel after stressful combat deployments is not well understood. Likewise, little is known about any resilience conferred by surviving prior trauma without PTSD. Preventive efforts prior to deployment could be focused by identifying subgroups of military personnel with increased risk for postcombat PTSD symptoms and screening individuals who may be vulnerable to combat-induced PTSD. We found that women and men who reported prior assault at baseline had more than twice the odds of new-onset PTSD symptoms or diagnosis after combat deployment in support of the wars in Iraq and Afghanistan.

A previous report using prospective data from the Millennium Cohort suggested nearly a 3-fold increase in new-onset PTSD symptoms or diagnosis after deployment among those reporting combat exposures when compared with nondeployed Cohort members (Smith TC et al, unpublished data). Moreover, as compared with nondeployed Cohort members, deployed personnel who did not report combat exposures did not have an increased risk for new-onset PTSD symptoms after deployment. From this and other studies (Smith TC et al, unpublished data),^{8,9} it is apparent that, while deployment itself may be stressful, combat exposure can be identified as the operative risk factor for new-onset PTSD. In the current study, only deployers who reported combat exposures were considered, to study a distinct at-risk population.

TABLE 1. Baseline Characteristics of 5324 Millennium Cohort Members Free of PTSD^a Symptoms or Diagnosis Before Combat Deployment^b by Prior Assault (July 2001 to June 2003)

Baseline Characteristic	Women		Men	
	No Assault (n = 637) No. (%)	Assault (n = 244) No. (%)	No Assault (n = 4401) No. (%)	Assault (n = 402) No. (%)
Birth year				
Pre-1960	84 (13.2)	30 (12.3)	633 (15.7)	54 (13.4)
1960–1969	203 (31.9)	85 (34.8)	1670 (41.3)	149 (37.1)
1970–1979	281 (44.1)	105 (43.0)	1534 (38.0)	173 (43.0)
1980 and forward	69 (10.8)	24 (9.8)	204 (5.1)	26 (11.3)
Education				
High school or less diploma/equivalent	316 (49.6)	139 (57.0)	2074 (51.3)	251 (62.4)
Some college or bachelor's degree	260 (40.8)	86 (35.3)	1625 (40.2)	124 (30.9)
Higher than bachelor's degree	61 (9.6)	19 (7.8)	342 (8.5)	27 (6.7)
Marital status				
Married	243 (38.2)	103 (42.2)	2803 (69.4)	237 (59.0)
Never married	315 (49.5)	99 (40.6)	1057 (26.2)	149 (37.1)
Divorced	79 (12.4)	42 (17.2)	181 (4.5)	16 (4.0)
Race/ethnicity				
White non-Hispanic	380 (59.7)	141 (57.8)	2766 (68.5)	293 (72.9)
Black non-Hispanic	118 (18.5)	46 (18.9)	359 (8.9)	32 (8.0)
Other	139 (21.8)	57 (23.4)	916 (22.7)	77 (19.2)
Cigarette smoking				
Never	428 (67.2)	128 (52.5)	2398 (59.3)	190 (47.3)
Past	121 (19.0)	56 (23.0)	961 (23.8)	113 (28.1)
Current	88 (13.8)	60 (24.6)	682 (16.9)	99 (24.6)
Problem alcohol drinking ^a				
No	576 (90.4)	186 (76.2)	3265 (80.8)	293 (72.9)
Yes	61 (9.6)	58 (23.8)	776 (19.2)	109 (27.1)
Prior deployment experience ^c				
No	494 (77.6)	184 (75.4)	2069 (51.2)	218 (54.2)
Yes	143 (22.4)	60 (24.6)	1972 (48.8)	184 (45.8)
Military rank				
Enlisted	444 (69.7)	190 (77.9)	2819 (69.8)	319 (79.4)
Officer	193 (30.3)	54 (22.1)	1222 (30.2)	83 (20.7)
Service component				
Active duty	341 (53.5)	136 (55.7)	2629 (65.1)	253 (62.9)
Reserve/National Guard	296 (46.5)	108 (44.3)	1412 (34.9)	149 (37.0)
Branch of service				
Army	450 (70.6)	170 (69.7)	2681 (66.3)	266 (66.2)
Air Force	127 (19.9)	50 (20.5)	802 (19.9)	62 (15.4)
Navy and Coast Guard	51 (8.0)	18 (7.4)	246 (6.1)	33 (8.2)
Marines	9 (1.4)	6 (2.5)	312 (7.7)	41 (10.2)
Occupational category				
Combat	56 (8.8)	25 (10.3)	1327 (32.8)	132 (32.8)
Healthcare	157 (24.7)	61 (25.0)	323 (8.0)	34 (8.5)
Service supply and functional support	216 (33.9)	96 (39.3)	841 (20.8)	89 (22.1)
Other	208 (32.7)	62 (25.4)	1550 (38.4)	147 (36.6)

^aAs defined in Methods section.^bDeployment in the wars in Iraq or Afghanistan between submission dates of baseline and follow-up questionnaires, and combat exposures reported.^cDeployment to the 1991 Gulf War or to Southwest Asia, Bosnia, or Kosovo anytime between January 1, 1998 and September 30, 2000.

TABLE 2. Characteristics of Those With Postdeployment New-Onset PTSD^a Symptoms Between Baseline (July 2001 to June 2003) and Follow-up (July 2004 to January 2006) Among 5324 Deployed^b Millennium Cohort Members

Baseline Characteristic	No. Women	No. Men	New-Onset PTSD ^a Symptoms	
			No. (%) Women	No. (%) Men
Overall	881	4443	117 (13.3)	288 (6.5)
Prior assault				
No	637	4041	64 (10.1)	238 (5.9)
Yes	244	402	53 (21.7)	50 (12.4)
Birth year				
Pre-1960	114	687	12 (10.5)	35 (5.1)
1960–1969	288	1819	32 (11.1)	95 (5.2)
1970–1979	386	1707	59 (15.3)	126 (7.4)
1980 and forward	93	230	14 (15.1)	32 (13.9)
Education				
High school or less diploma/equivalent	455	2325	81 (17.8)	222 (9.6)
Some college or bachelor's degree	346	1749	29 (8.4)	55 (3.4)
Higher than bachelor's degree	80	369	7 (8.8)	11 (3.0)
Marital status				
Married	346	3040	43 (12.4)	181 (6.0)
Never married	414	1206	56 (13.5)	94 (7.8)
Divorced	121	197	18 (14.9)	13 (6.6)
Race/ethnicity				
White non-Hispanic	521	3059	65 (12.5)	205 (6.7)
Black non-Hispanic	164	391	28 (17.1)	25 (6.4)
Other	196	993	24 (12.2)	58 (5.8)
Cigarette smoking				
Never	556	2588	68 (12.2)	126 (4.9)
Past	177	1074	22 (12.4)	77 (7.2)
Current	148	781	27 (18.2)	85 (10.9)
Problem alcohol drinking ^a				
No	762	3558	96 (12.6)	209 (5.9)
Yes	119	885	21 (17.7)	79 (8.9)
Prior deployment experience ^c				
None prior	678	2287	87 (12.8)	172 (7.5)
1991 GW or Bos/Kos/SWA	203	2156	30 (14.8)	116 (5.4)
Military rank				
Enlisted	634	3138	100 (15.8)	253 (8.1)
Officer	247	1305	17 (6.9)	35 (3.0)
Service component				
Active duty	477	2882	66 (13.8)	157 (5.5)
Reserve/National Guard	404	1561	51 (12.6)	131 (8.4)
Branch of service				
Army	620	2947	94 (15.2)	238 (8.1)
Air Force	177	864	12 (6.8)	23 (2.7)
Navy and Coast Guard	69	279	8 (11.6)	10 (3.6)
Marines	15	353	3 (20.0)	17 (4.8)
Occupational category				
Combat	81	1459	9 (11.1)	85 (5.8)
Healthcare	218	357	18 (8.3)	21 (5.9)
Service supply and functional support	312	930	56 (18.0)	71 (7.6)
Other	270	1697	34 (12.6)	111 (6.5)

^aAs defined in Methods section.^bDeployment in the wars in Iraq or Afghanistan between submission dates of baseline and follow-up questionnaires, and combat exposures reported.^cDeployment to the 1991 Gulf War or to Southwest Asia, Bosnia, or Kosovo anytime between January 1, 1998 and September 30, 2000.

TABLE 3. Odds of New-Onset PTSD^a Symptoms During Follow-up (July 2004 to January 2006) for Prior Assault (Baseline July 2001 to June 2003) and Among 5324 Deployed^b Millennium Cohort Members

	Women (n = 881) OR (95% CI)	Men (n = 4443) OR (95% CI)
Prior assault (yes/no)		
Unadjusted	2.5 (1.7–3.7)	2.3 (1.6–3.1)
Adjusted for baseline birth year, education, race/ethnicity, prior deployment, military rank, service component, branch of service, and occupation	2.4 (1.6–3.6)	2.1 (1.5–3.0)
Adjusted for above plus baseline marital status, cigarette smoking, and problem alcohol drinking	2.3 (1.5–3.5)	2.0 (1.4–2.8)

^aAs defined in Methods section.^bDeployment in the wars in Iraq or Afghanistan between submission dates of baseline and follow-up questionnaires, and combat exposures reported.

Nearly 30% of women reported a prior sexual or violent assault, with over half of those reporting sexual assault alone. In contrast, 10% of men in this subpopulation reported a prior assault, almost all due to violent (not sexual) assault. Despite these sex differences in prevalence and type of prior assault, the odds of new onset of PTSD symptoms after deployment and reported combat exposures were similar for men and women, with both having a more than 2-fold increase. This doubling of the odds persisted after adjusting for demographic, military, and behavioral characteristics, suggesting that having a history of assault is more important than either the sex of the respondent or the type of assault.

It could be hypothesized that US military members reporting prior assault with no evidence of PTSD, who are mentally and physically healthy enough to deploy, might demonstrate particularly high resilience to subsequent stressful experiences. Their ability to cope with past stress may help to identify and effectively manage negative experiences and mental health symptoms. However, this hypothesis contrasts with the findings of the current report for both men and women. Previous studies show that those with past traumatic events have a higher likelihood of encountering future traumatic events, which may result in increased risk for PTSD.^{37,38} A history of trauma could be related to increased risk-taking behavior, such as excessive alcohol consumption, or entering into combat-related occupations and volunteering for deployment to combat areas.^{37,38} Consistent with previous research, we found that those who reported prior assault also reported more smoking and problem drinking.^{39,40} These behaviors could reflect attempts to manage psychological symptoms, a general tendency toward risk taking, or other unmeasured characteristics associated with future risk of PTSD. Adjusting for these behaviors in the present study had little effect on the ORs for prior

assault, arguing that prior assault has specific, potentially causal effects that increase the risk of new-onset PTSD in combat-exposed military members.

The finding that both current and past smoking, as well as problem alcohol drinking, were associated with an increase in proportion of reported prior assault is intriguing. More research is necessary to understand the temporal sequence of prior assault, the use of coping mechanisms, and the vulnerability to future trauma-inflicted mental health disorders. This report also documents subgroups of this subset of the cohort having a much larger burden of new-onset PTSD symptoms—specifically, those who reported prior assault and who were also younger, high school or less educated, current smokers, problem alcohol drinkers, and enlisted personnel. Though the PTSD risk conferred by combat exposure and heightened by previous life events may not be preventable, these subsets of individuals who seem to be even more vulnerable deserve closer attention from the medical community.

Limitations to these analyses should be noted. Although approximately 40% of the Millennium Cohort was deployed in the wars in Iraq and Afghanistan from 2001 through 2006, only 30% of the US military personnel on rosters at the time had deployed during this time period. Nonetheless, multiple investigations of possible reporting and selection biases in baseline Millennium Cohort data suggest reliable data and a representative sample of military personnel.^{25,28–31,34,41} Biases may exist with regard to the baseline participants who did not submit a follow-up questionnaire. Changes in exposure reporting have been associated with changes in PTSD symptoms.⁴² Since assault, exposures, and PTSD symptoms are determined by self-report, rates in the present study are estimates of the true prevalence of exposures and outcomes. Self-reported measurements of key exposures (assaults) and outcomes (PTSD symptoms and self-reported diagnosis) were used in this study. These are potentially biased, although it is unlikely that the report of prior assault was influenced by presence of PTSD, since all participants at baseline were judged to be free from PTSD. Use of the PCL-C, along with the DSM-IV criteria and a sum of 50 points, has been found to correlate well with a physician's assessment of PTSD symptoms,³⁴ and the PCL-C is internally valid in Millennium Cohort members.²⁸ However, the use of a standardized instrument for self-reported data as a surrogate for PTSD diagnosis is imperfect. Lastly, persons who experienced assault differed on several characteristics from persons who did not. Although we adjusted for such observed differences in this analysis, the possibility exists for residual confounding due to unmeasured characteristics associated with the likelihood of assault and the risk of developing PTSD.

Despite limitations, these analyses offer the first large, prospective epidemiologic investigation of predisposition for new-onset PTSD symptoms in combat-deployed military men and women. The large sample of both men and women, along

with adjustment for multiple potential confounding variables, allowed for a robust estimate of the association of prior assault with new-onset PTSD symptoms. PTSD is often underreported in electronic healthcare databases among populations not readily accessing care for mental disorders, making it necessary to rely on self-reported baseline and follow-up measures, as in this investigation. Using the DSM-IV criteria with a PCL-C score of at least 50 increased the specificity of identifying true PTSD.

Deployed military members exhibit an overall remarkable resilience to stressful combat and noncombat experiences as exemplified by most of those exposed to combat not developing PTSD symptoms. However, certain subpopulations, particularly combat-exposed deployers (Smith TC et al, unpublished data), bear a disproportionate burden of PTSD symptoms. Among combat-exposed deployers, both women and men with a history of sexual or violent assault experienced an additional doubling of odds of new-onset PTSD. Substantial proportions of combat-exposed women (30%) and men (10%) reported prior assaults, highlighting a sizable population of military members at higher risk for PTSD. Because the subgroup with additional risk due to prior assault can be identified prior to deployment, options for screening and prevention need to be considered. Further longitudinal investigation of those with prior assault will yield insight into possible resiliency or vulnerability that this population may have in the incidence, resolution, or recurrence of PTSD symptoms.

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14. ABSTRACT (maximum 200 words)

Background. Studies have reported that posttraumatic stress disorder (PTSD) is prevalent U.S. military personnel returning from combat deployment in support of the Global War on Terrorism (GWOT). Vulnerability to or resilience against PTSD in individuals following overwhelming stress is not well understood. The objective of this study was to prospectively examine the relationship between prior assault and new-onset PTSD symptoms in a large U.S. military cohort deployed in support of GWOT.

Methods. Millennium Cohort baseline enrollment data (July 2001 to June 2003) were obtained before GWOT. Follow-up data on health outcomes (June 2004 to February 2006) were collected from over 55,000 participants. Of these, 5324 were deployed in support of GWOT, reported combat exposures, and were free of PTSD at baseline (women=881, men=4443). Multivariable logistic regression was used to model the risk of new-onset PTSD in relation to prior assault.

Results. Analyses were conducted stratifying by sex and adjusting for baseline age, education, marital status, race/ethnicity, cigarette smoking, problem drinking, rank, service component, service branch, and occupation. New-onset PTSD symptoms or diagnosis among deployers reporting combat exposures occurred in 21.7% of women who reported prior assault and 10.1% of those not reporting prior assault. Among men, the rates were 12.4% and 5.9%, respectively. Adjusting for baseline factors, the risk of new-onset PTSD symptoms was more than twofold higher in both women and men who reported assault prior to deployment.

Conclusions. Survival from prior assault appears to confer increased risk for, rather than resilience against, PTSD symptoms among military professionals deployed to recent combat operations.

15. SUBJECT TERMS
combat disorders, stress disorders; posttraumatic, cohort studies, mental health, violence

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